

# Codes and Standards Update



AMERICAN NATIONAL STANDARD

FOR  
BASIC PRACTICE  
FOR COMPRESSION  
NATURAL GAS (NGV) F

A project of the?  
Gas Vehicle Coal  
NGV  
THE NATURAL GAS VEHICLE COAL

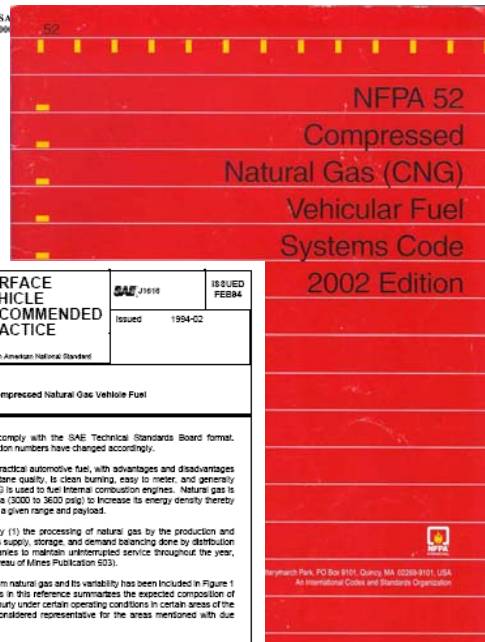
<b>SAE</b> The Engineering Society For Automotive, Aerospace, Land Gas Air and Space, <b>INTERNATIONAL</b> 400 Commonwealth Drive, Warrendale, PA 15090-0001		<b>SAE</b> J1618 Issued 1994-02		ISSUED FEB84
<b>SURFACE VEHICLE RECOMMENDED PRACTICE</b>  An American National Standard		1994-02		
<b>Recommended Practice for Compressed Natural Gas Vehicle Fuel</b>				
<p><b>Foreword</b>—This document has been changed to comply with the SAE Technical Standards Board format. Definitions have changed to Section 3. All other section numbers have changed accordingly.</p> <p>1. <b>Scope</b>—Compressed Natural Gas (CNG) is a practical automotive fuel, with advantages and disadvantages when compared to gasoline. It has a good octane quality, is clean burning, easy to meter, and generally produces lower vehicle exhaust emissions. CNG is used to fuel internal combustion engines. Natural gas is normally compressed from 20 690 to 24 802 kPa (3000 to 3600 psig) to increase its energy density thereby reducing its on-board vehicle storage volume for a given range and payload.</p> <p>The properties of natural gas are influenced by (1) the processing of natural gas by the production and transmission companies and (2) the regional gas supply, storage, and demand balancing done by distribution companies often in concert with pipeline companies to maintain uninterrupted service throughout the year, e.g., peakshaving with propane-air (see U.S. Bureau of Mines Publication 653).</p> <p>Information on the properties of distribution system natural gas and its variability has been included in Figure 1 and can be found in G16-G10.12. The analysis in this reference summarizes the expected composition of natural gas in 26 cities. Composition can vary hourly under certain operating conditions in certain areas of the country. Thus the data should generally be considered representative for the areas mentioned with due consideration for local variation.</p> <p>Natural gas is composed chiefly of methane (generally 85 to 95 mole percent) with the balance being a decreasing proportion of non-methane alkanes (i.e., ethane, propane, butanes, etc.).</p> <p>Other components found in natural gas are nitrogen (<math>N_2</math>), carbon dioxide (<math>CO_2</math>), water, oxygen, and trace amounts of lubricating oil (from compressors) and sulfur found as hydrogen sulfide (<math>H_2S</math>) and other sulfur compounds. Before entering the transmission system, it is processed to meet limits on hydrogen sulfide, water, condensibles of heavier hydrocarbons, inert gases such as carbon dioxide and nitrogen, and energy content. Mercaptan odorants (e.g., tertiary butyl mercaptan) are added by local distribution companies (LDCs) for safety reasons to detect the presence of natural gas which otherwise would be odorless.</p> <p>Water content and other corrosion precursors, heavier hydrocarbons which may condense within the fuel container, particulate matter, oil and energy content need to be controlled in order to minimize corrosion and provide satisfactory low-temperature vehicle operation, performance, and emissions levels.</p>				

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Doug Horne &  
Hank Seiff

NGVTF  
August 4, 2005



# The

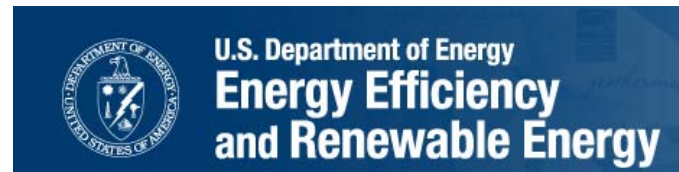


provides representation to C&S committees that are reviewing existing guidelines and drafting new ones that may impact the utilization of alternative fuels (particularly CNG and LNG) in transportation vehicles and fueling stations

to



and



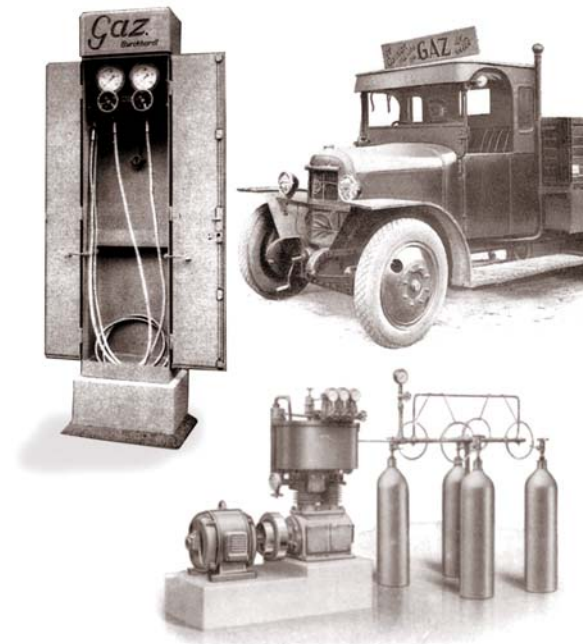
Codes and Standards development provides alternative fuel technology transfer involving:

- industry
- end users (vehicles and infrastructure)
- government agencies and national laboratories

# **Good NGV Codes and Standards are Critical to:**

- the building of alternative fuel vehicles and infrastructure
- the use of alternative fuels by fleets
- the goal of petroleum displacement
- a smooth transition to a potential hydrogen future

**Without good C&S,  
We're Behind the Times!**



# Standards/Guidelines-Setting Organizations

(Not All-Inclusive)

NFPA – National Fire Protection Association

Uniform Fire Code

International Fire Code

FTA-DOT – Federal Transit Administration

NHTSA-DOT – National Highway Traffic Safety Administration

FMCSA-DOT – Federal Motor Carrier Safety Administration

DOT HM Regulations (Transportation and Reference for LNG Storage Vessels)

EPA – Environmental Protection Agency

SAE – Society of Automotive Engineers

CSA-International

CGA – Compressed Gas Association

ANSI – American National Standards Institute

ISO – International Organization for Standardization

ECE - Economic Commission of Europe

OIML – International Organization of Legal Metrology

ASME Boiler and Pressure Vessel Code (Storage Vessels)

California Code of Regulations

Railroad Commission of Texas

PA DOT

AAMVA – American Association of Motor Vehicle Administrators

Massachusetts Registry of Motor Vehicles

CVSA – Commercial Vehicle Safety Alliance

# We'll cover only a few C&S issues you should be aware of:

**NFPA 52**



**SAE**



**ANSI/CSA**



**CSA INTERNATIONAL**  
8501 East Pleasant Valley Rd.  
Cleveland, Ohio 44131

# NFPA 52



National Fire  
Protection Association

The authority on fire, electrical, and building safety

**Present Title: Compressed Natural Gas Vehicular Fuel Systems Code**

**New (2005) Title: Vehicular Fuel Systems Code**

## **Major Changes:**

- **Incorporate LNG (NFPA 57)**
- **Include Gaseous and Liquid Hydrogen**  
Ch. 13 - LH<sub>2</sub> Engine Fuel Systems “will be put on hold as new material for next edition. This is a developing technology and it is not clear the code requirements are required yet.”

# NFPA 52



## Major Problem:

A number of requirements state that a final stage manufacturer must get its design approved by and/or follow the engineering recommendations of the original equipment manufacturer (OEM).

This may be impossible to achieve since a number of OEM's are leaving the NGV arena and/or would not provide approval or engineering recommendation for designs of the final stage manufacturer.

This amounts to a restraint of trade since the final stage manufacturer may either be considered a competitor or the OEM could refuse to take responsibility/liability for approving another's design.

This requirement does not add to the safety of the design of the alternative fuel vehicle. The final stage manufacturer should have responsibility and liability for its own design. NFPA 52 should include performance requirements for safety and not get involved in contractual matters

# NFPA 52



National Fire  
Protection Association

The authority on fire, electrical, and building safety

## What we are doing about it:

Since this document was approved at the June NFPA meeting, CVEF filed an appeal with the NFPA Standards Council to seek reversal of the Technical Committee's actions.

The appeal was heard by the Standards Council on July 25 at their meeting in Boston.

We will report on the results at the NGVTF meeting.





## Truck and Bus Alternative Fuels Subcommittee

- New Chair – Doug Horne
- Responsible for:
  - Published Recommended Practices:
    - J2406 - CNG Powered Medium and HD Trucks
    - J2343 - LNG Powered HD Vehicles
    - J2645 - LNG Vehicle Metering and Dispensing Systems



## Truck and Bus Alternative Fuels Subcommittee

- Responsible for:

- Documents in Progress:

- J1740 - LNG Vehicle Fueling Connectors
    - J2699 - LNG Vehicle Fuel
    - J2700 - LNG Vehicle Fuel Tanks

# ANSI/CSA



CSA INTERNATIONAL  
8501 East Pleasant Valley Rd.  
Cleveland, Ohio 44131

## Automotive Technical Committee

- **Responsible for:**

- Published ANSI Standards:**

- NGV1- CNG Vehicle Fueling Connection Devices
    - NGV2 - Basic Requirements for CNG Vehicle Fuel Containers
    - NGV3.1- Fuel System Components for Natural Gas Powered Vehicles
    - NGV4.1- NGV Dispensing Systems
    - NGV4.2 - Hoses for NGVs and Dispensing Systems

# ANSI/CSA



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Cleveland, Ohio 44131

## Automotive Technical Committee

- **Responsible for:**

- Published ANSI Standards:**

- NGV4.4 - Breakaway Devices for Natural Gas Dispensing Hoses and Systems
    - NGV4.6 - Manually Operated Valves for Natural Gas Dispensing Systems
    - NGV4.8 - NGV Fueling Station Reciprocating Compressor Guidelines
    - PRD1 - Basic Requirements for Pressure Relief Devices for NGV Fuel Containers

# ANSI/CSA



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Cleveland, Ohio 44131

## Automotive Technical Committee

- **Responsible for:**

- Documents in Progress:**

- HGV2 - Compressed Hydrogen Vehicle Fuel Containers
    - HGV4.1 - HGV Dispensing Systems
    - HGV4.2 - Hoses for Compressed Hydrogen Vehicles & Dispensing Systems
    - HGV4.3 - Temperature Compensation Systems for Gaseous Hydrogen Vehicle Fueling Stations
    - HGV4.4 - Breakaway Devices for Hoses used in Compressed Hydrogen Vehicle Fueling Stations

# ANSI/CSA



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8501 East Pleasant Valley Rd.  
Cleveland, Ohio 44131

## Automotive Technical Committee

- **Responsible for:**

### **Documents in Progress:**

- HGV4.5 - Priority and Sequencing Equipment for Hydrogen Gas Vehicle Fueling
- HGV4.6 - Manually Operated Valves used in Gaseous Hydrogen Vehicle Fueling Stations
- HGV4.7 - Automatic Valves for use in Gaseous Hydrogen Vehicle Fueling Stations
- NGV4.8 - HGV Fueling Station Compressors
- HPRD1 - Pressure Relief Devices for HGV Fuel Containers

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## Automotive Technical Committee

- Responsible for:  
**Potential Documents:**
  - HCNG (CNG/H<sub>2</sub> Blends)

**C&S Work is Essential to a Successful NGV Industry and to Provide a Smooth Transition to Hydrogen.**

**It Brings Together Industry, Government, National Labs, Local Authorities and all concerned to assure Safe and Economical Transportation.**

**With Good C&S,  
We're Up to Date!**



**Dodge Charger CNG Concept Vehicle**